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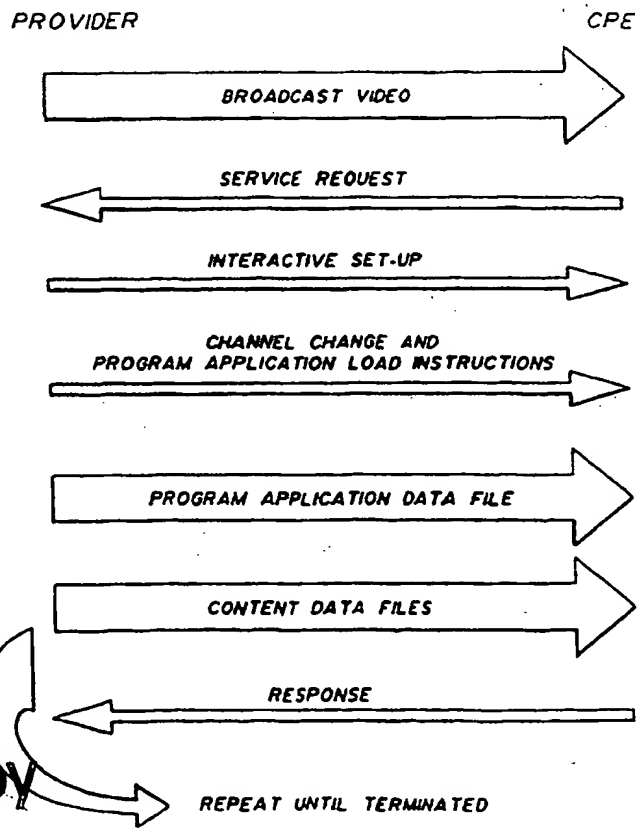
(54) Title: INTERACTIVE BROADBAND MULTIMEDIA SYSTEM

(57) Abstract

A method and apparatus for facilitating interactive television is disclosed. The method for facilitating interactive television comprises the following steps: accessing an interactive program; executing said interactive program; and providing an end user with a set of coded instructions which may be transmitted upstream.



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INTERACTIVE BROADBAND MULTIMEDIA SYSTEM

Field of the Invention

The present invention is directed to interactive television systems. In particular, the present invention is directed to interactive television systems which facilitate the transmission of control signals through interactive media, and which can be delivered to an end user station such as a television receiver or computer work station.

Background of the Invention

The present invention is directed to interactive television systems. In particular, the present invention is directed to interactive television systems which may be used to facilitate two-way communication between an end user and a provider center or service and which can be used to broadcast data files which may be accessed by a locally stored program to be displayed on a monitor as one or more presentations. The prior art has disclosed systems and devices which facilitate interactive television presentations.

Such prior art systems are characterized by the inclusion of dedicated phone or transmission lines or expensive hardware.

The use of such dedicated systems drastically increases the cost associated with the use of such systems.

The PRODIGY® information service, which is marketed widely by Sears® and IBM® claims to use a distributed database architecture. However, that system only distributes the database to regional main frame computers. The underlying technology still relies on the maintenance of continuous real time two-way communication by a personal computer. Nearly all videotex services use phone lines and modems to link the two, although some experiments with two-way cable television and other media have been attempted. Such systems have exhibited numerous limitations.

Because each user of a traditional videotex system is directly connected to a central main frame computer when "on-line", the central computer must be capable of simultaneously handling the many subscribers it gets during prime usage periods. The central computer may sit idle the rest of the time. If there is a problem with a central computer or communications net linking it to the end users, the entire system may cease functioning. Thus, prior art systems have typically relied upon a computer/print interfaces.

The speed with which information may be retrieved in such systems is limited to the speed with which the central computer can recognize a user's request and locate the information in a central data storage media. Even the largest and fastest of central computers cannot overcome the limitations of how quickly information may be carried by the phone lines or other media that connect it to the user. Phone lines typically have a narrow

bandwidth and can carry only a limited amount of information. Typical phone line communications are limited to a speed of 2400 baud.

The newer Integrated Services Digital Network (ISDN) and fiber optic cable technologies provide greater information transmission capability. However, even with high speed fiber optics which connect the central computer to a home terminal, the largest computers cannot keep up with an entire city, particularly during prime hours. These systems rely upon the single interaction of a computer and computer

The bandwidth issue has never been adequately addressed because until recently all computer interfaces were just character-based or used very low resolution alpha mosaic-style displays utilizing protocol such as NAPLPS or TELETEL. Because these systems do not use attractive graphical interfaces, they are not pleasing to the eye. Graphical user interfaces have become very popular because they are far more interesting and easier to use. Such systems utilize much more memory storage space.

There are a number of prior art patents directed to interactive communications systems. U.S. Patent Nos. 5,093,718 and 5,220,420 are directed to Interactive Home Information Systems. These patents disclose systems which incorporate a nodal structure which feeds in a broadband signal. The nodes are dedicated computers which reside outside of a house or group of houses. The nodes couple to head end computer which is preferably an industrial microprocessor-based controller with high capacity magnetic or optic read/write storage devices.

U.S. Patent No. 5,233,436 discloses an interactive video system having a display for displaying camouflaged information which is discernible only when viewed through a partially transparent viewing screen having zones with light transmission characteristics corresponding to the characteristic of respective displayed image regions. The user of the system is required to input information which can be derived only by recognizing the camouflaged information with the aid of the screen.

Finally, U.S. Patent No. 4,745,559 discloses a data transmission system in which data templates are downloaded so as to facilitate data transmission and storage. This patent uses a system in which storage templates are locally retrieved and are associated with a unique identifier. The database records are stored locally and are updated from a remote location.

Each of the above systems requires dedicated hardware as shown for example in U.S. Patent Nos. 5,093,718 and 5,220,420 or the maintenance of a locally stored database. It would be desirable to provide a system in which interactive data could be broadcast to many customer premise equipment devices (CPE). Such devices could obtain control, graphical and audio data by recognizing and accepting specific data files within broadcast data streams and acting upon the data files such that the viewer would achieve the simulation of an interactive television system. The system would broadcast data files which would be selectively retrieved by the individual viewer on a CPE. The files would be broadcast to all CPE'S in the system. The executing program could become resident and active at the CPE by being loaded from a data stream within a broadcast video channel; a data stream

within a broadcast data channel; a pointcast data signal directed to a specific CPE or memory storage within the CPE. End user responses could be transmitted back to the provider using the network return data path. In this way, new files could be broadcast through the system such that the system could access the new information.

Summary of the Invention

The present invention is directed to a method for facilitating interactive television by an end user comprising the following steps: accessing a computer program for an interactive television display; executing said interactive program so as to provide at least one screen display; and providing a set of broadcast data files which may be accessed by said interactive program.

In a preferred embodiment, the present invention is directed to an apparatus for facilitating interactive television comprising: means for accessing an interactive television application program and presentation a plurality of broadcast data files; and means for controlling said program and broadcast files broadcast on a television monitor.

In yet a further embodiment, the present invention is directed to an apparatus for facilitating interactive television comprising: means for processing an interactive television application program said program being pre-stored in said computer memory; means for accessing broadcast data files, each of said files corresponding to a presentation, and having an identification system associated therewith; and means associated with said end user station for transmitting a set of instructions

to a remote location to control the broadcast of new data files.

Brief Description of the Figures

Figure 1 is a perspective view of an interactive control system in accordance with the present invention.

Figure 2 is a block diagram of an interactive television system in accordance with the present invention.

Figure 3 is a block diagram of an enhanced interactive television system in accordance with the present invention.

Figure 3A is a block diagram of an enhanced interactive system in accordance with the present invention which utilizes a computer and monitor as a presentation system.

Figure 4 is a block diagram of an enhanced television network system in accordance with the present invention.

Figure 5 is a flow chart of an interactive service in accordance with the present invention.

Figures 6 - 8 are screen displays in accordance with the present invention.

Detailed Description of the Preferred Embodiment

The present invention is described with reference to the enclosed Figures wherein the same numbers are utilized where applicable. In a broadest embodiment, the present invention is directed to a network having downstream broadcast capabilities, upstream interactive communication capability and a microprocessor-based CPE (Customer Premise Equipment) capable of loading and executing a core program and accessing broadcast data files. The present invention accesses specific data files which are broadcast and which correspond to video, textual and/or audio presentation.

Referring to Figure 1, an interactive system of the present invention is described. As shown, in a most preferred embodiment of the present invention, the system 10 of the present invention is utilized in association with a television monitor 12 and end user control 13. End user control 13 may be accessed via a hand-held infrared controller 14. The system 10 of the invention, in a first embodiment, is housed in a control box or customer-premised equipment (CPE) 14. The box 14 is preferably a set-top control box connected to the television. The control box 14 is controlled by IR controller 15. In a most preferred embodiment shown in Figure 4, the CPE 14 comprises a CPU central processor 16, memory 18, I/O ports 20 and operating system 21. The CPE accesses data files which are broadcast.

The control box 14 or customer-premised equipment (CPE) includes circuitry for facilitating the receipt and storage of an interactive core program. As shown in Figures 2 and 3, the control mechanism in a preferred embodiment is a microprocessor-based control system. The system incorporates microprocessor 16, RAM 18 which processes a core program and chooses broadcast data files and an input/output device 20 which transmits commands to the set-top control box. As shown in Figure 3, the device may include a modem 24 connected to the broadcast center 22 via a telephone line 26. The modem can connect to a broadcast center such that a new program or set of data files can be broadcast. As shown in Figure 3A, the end user system may comprise a computer and monitor 29 rather than a television receiver. The present invention contemplates accessing a core program which facilitates the receipt and control of data files. Each data

file represents a presentation.

The present invention contemplates several mechanisms for delivering the core program data to the CPE 14. Initially, the core program may reside on the CPE 14. In addition, the program may be transmitted from a data stream within a broadcast data signal associated with a broadcast video channel. Alternatively, the CPE device 14 may be switched to a broadcast data channel and the program pointcast from a data stream within the broadcast channel.

The core program identifies, loads and executes specific data files which are broadcast. The data files are displayed as textual information still visual audio information based upon specific control elements within the data file. The data files are broadcast. The program may need to switch among different broadcast channels in order to locate the desired data files.

In a preferred embodiment, the data files are obtained by the core program from a broadcast data signal associated with a broadcast video channel and a broadcast data signal associated with a broadcast data channel. The core program is instructed which data file identification number (ID) to identify and execute by the previous executed data file or a control command from the provider delivered by the network's interactive communications system. Hence, the core program facilitates the receipt of files from the broadcast.

When the beginning of the desired data file is identified in the broadcast data stream, for example, by a header ID, that file is acted upon by the program application. Each file will typically contain a still frame image and software for

controlling the selection of new files broadcast. Thus, for example, a presentation is provided which queries the user to make an additional selection. The user may select the core program will then search for the selection from the broadcast data files. The file selected will be identified by its file ID and then the video element displayed on the monitor. The program control elements of the data file provide the program application with the instructions necessary to act upon the other elements of the data file. The instructions may indicate that the video element is to be displayed in full or partial screen with a repeating audio element for a specified amount of time.

The number, placement, size of user interface buttons would also be indicated along with the action to be taken upon button selection. Actions may include executing an audio element, displaying a text element, loading and executing additional data files. The actions are activated with the controller. The files may be compressed such using MPEG or other compression technology. In the case of an MPEG compression system, six megabits of data may be transmitted per second. A data file will variable in byte size. Thus over 60 files may be transmitted per second. The core program will identify files by the respective file ID as different files are requested, additional files will be identified by the program. Thus if the file ID is called for, the program will the presentation.

During the program application execution, end user responses are communicated upstream via the instructive call communication return path. This return path may comprise the CATV cable. Alternatively, the path may also comprise a modem dialer affixed

to the phone system at the local premises which transmits messages to the central station.

The upstream return instruction is coded to identify all data files being accessed and the end user response thereto. The return information may be used to collect usage, statistics, notification and user requests or purchases. Additionally, the information transmitted by the CPE may dynamically adjust the frequency OF which a specific data file is broadcast by the broadcast data file server. Hence, if subscribers don't request certain information on a frequent enough basis, those files can be deleted from the system.

It is to be noted that the frequency with which a specific data file is delivered in the broadcast stream may be varied based upon an algorithm which determines the likelihood of need by any CPE. The core program may be instructed to identify and load a specific data file prior to it being needed based upon an algorithm which determines the likelihood it will be needed by the core program.

Figure 4 comprises a more detailed embodiment of the present invention as applied to a communication network. As shown, the system in a most preferred embodiment comprises three principal regions: the home/business; the transport network and the digital integration center. The home or business includes the set top/local server (CPE) 14, an MPEG (decoder) 17, CPU 16, memory 18, ports 20 and operating system 21. While the invention is shown in the context of an MPEG compression system, it is to be appreciated that other compression technologies may be used with the present invention.

The local CPE 14 communicates with a transport network including host digital terminal 31, a central office 33 and a Level I gateway 35. The host digital terminals are in communication with the gateway 35, CPE 14 and central office 37. The Level 1 Gateway 35 includes a network controller 36, video administration module 38 and statistics module 40.

The third major element is the digital integration center 42. This element includes the API (Applications Program Interface) 44 which includes the level II gateway server 46, text server 48, interactive response server 50, channel provisioning system (EPIC) 52, network coordinator 54 and statistics databases 56. The center 42 may include satellite receivers 58, off-air receivers 60, local origination 62, NVOD players 64, a multimedia applications server 66 and VOD (Video On Demand) server 68. The center also includes an MPEG encoder 70 and ATM encoder and MUX 72. The digital integration center functions as the central broadcast center which broadcasts the data files through the central office and to the individual homes or businesses in the system. The end user may access an interactive presentation via the hand-held controller 15. The core program will be activated. The broadcast signal coming through the home/business will include files which will be accessible through the CPE 14.

Figure 5 is a flow diagram which displays the operation of the present invention. As shown, a provider transmits a broadcast video signal. A subscriber who desires to engage an interactive session transmits a service request via the hand-held IR controller or by activating buttons on the CPE. The provider then establishes an interactive response session and for example,

instructs the CPE to perform a channel change and program application load instructions. The program application data file and the content data files are transmitted to the CPE via a broadcast signal. The subscriber can then query the provider for additional presentations which will be broadcast from the center.

Referring to Figures 6 through 8, examples of interactive presentations are shown and disclosed. Initially, the subscriber will input the interactive command in the controller. This can be accomplished by sending a signal or command to down-load the interactive presentation. The command can be input either with the hand-held tuner or by the activation of a button on the control box or CPE. In the following example there are three interactive presentations which are presented on the television monitor. A first is for the Asbury Park Press. A second is for the Franklin Mint. The third is for SHOP RITE Supermarkets.

Each of the presentations has an associated file number which is used to identify the presentation in the broadcast stream.

Referring to Figure 6, the screen for the Franklin Mint is disclosed. The screen shows an advertisement for the Franklin Mint with a plurality of access items including an on-line catalog, a satisfaction guarantee, ordering and shipping information as well as a screen for new information.

The user will activate the particular presentation desired which will draw in a broadcast data. The presentation selected may be displayed. Additional screens may be accessed from the broadcast and shown on the screen. Further information may be accessed by transmitting a signal upstream. Additional

information may then be broadcast to the CPE 14. It is to be noted that information does not have to be received upstream before the next file is accessed.

Figure 8 provides an example for incorporating a newspaper such as the Asbury Park Press into the system. In this example, the Asbury Press would provide a series of interactive presentations to subscribers of the system. These interactive presentations could include, for example, merchandise, pets, services, personals, real estate and transportation. A subscriber who, for example, desires to view a real estate presentation will activate the real estate command via the hand-held controller.

A real estate presentation will then be shown to a subscriber on the TV monitor. If additional information is requested, a command can then be transmitted on the return path, by the IR controller for example. The command alternatively could be transmitted via a modem, and additional presentations may then be broadcast and presented on the screen.

In yet a further example, a consumer may watch a program such as "CNN Money Line" in which a well known mutual fund manager may be describing the investment strategy of the fund. A text overlay will be displayed querying the consumer if he would like to have additional information via an interactive application.

By responding affirmatively using the remote control 15, the present invention will automatically switch the user to the application and later switch the consumer back to the original program when he is finished with the application. During the

application, additional information can be given to the consumer is broadcast to the consumer in the form of files. If the consumer transmits a signal upstream, information on the consumer can be collected and transactions can be completed.

The examples of effective uses include services, products, information, insurance, travel. The ability to target interactive promotions, advertisements, and marketing efforts is enormous. The invention can identify consumers by demographics, geography, or programming viewing preferences.

The present invention has been described with reference to the above-detailed description. It is to be appreciated that other embodiments fulfill the spirit and scope of the present invention and that the true nature and scope of the present invention is to be determined with reference to the claims appended hereto.

Claims

1. A method for facilitating interactive television by an end user comprising the following steps:

accessing a computer program for an interactive television display;

executing said interactive program so as to provide at least one screen display; and

providing a set of broadcast data files which may be accessed by said interactive program.

2. The method of claim 1 wherein said set of data files is transmitted on the vertical blanking interval of the video signal transmitted to said television.

3. The method of claim 1 wherein said interactive program is pre-stored in a computer memory associated with the end user.

4. The method of claim 1 wherein the interactive program is transmitted on a second broadcast channel.

5. Apparatus for facilitating interactive television comprising:

means for accessing an interactive television application program and presentation a plurality of broadcast data files; and

means for controlling said program and broadcast files broadcast on a television monitor.

6. Apparatus for facilitating an interactive television session of claim 5 wherein said interactive presentation resides on a computer memory.

7. Apparatus for facilitating interactive television of claim 6 wherein said presentation is transmitted on a broadcast signal.

8. Apparatus of claim 7 wherein said data signal is transmitted through the vertical blanking interval.

9. Apparatus of claim 7 wherein said signal is broadcast to a second broadcast channel.

10. Apparatus for facilitating interactive television comprising:

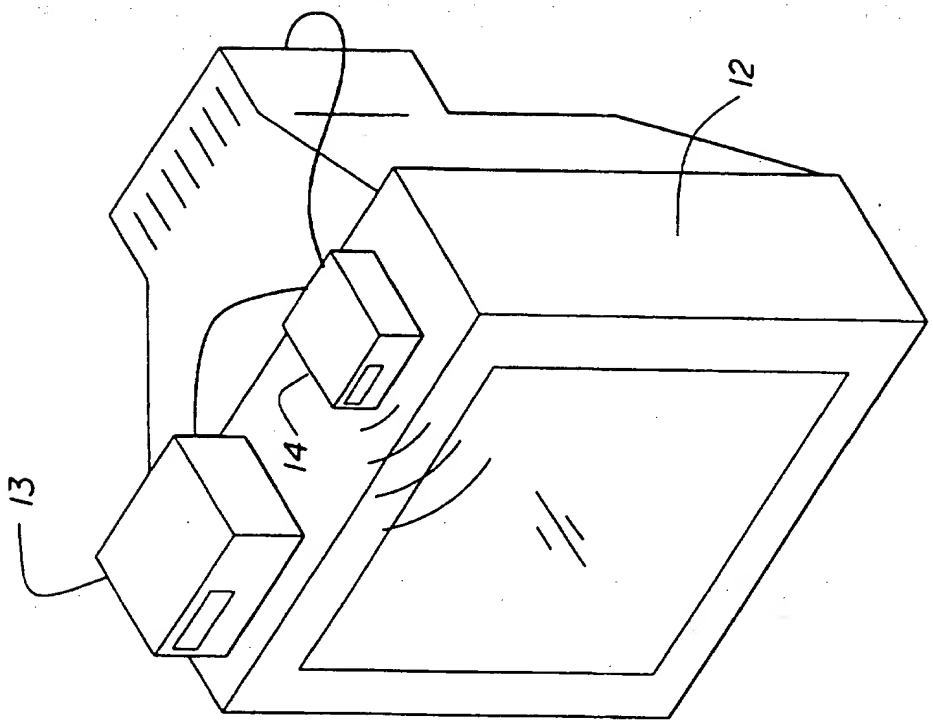
means for processing an interactive television application program said program being pre-stored in said computer memory;

means for accessing broadcast data files, each of said files corresponding to a presentation, and having an identification system associated therewith; and

means associated with said end user station for transmitting a set of instructions to a remote location to control the broadcast of new data files.

11. The apparatus of claim 10 wherein said end user station is a television receiver.

12. The apparatus of claim 10 wherein said end user station is a computer and monitor.



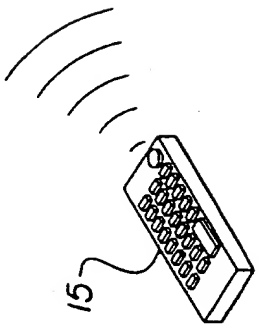


FIG. 1

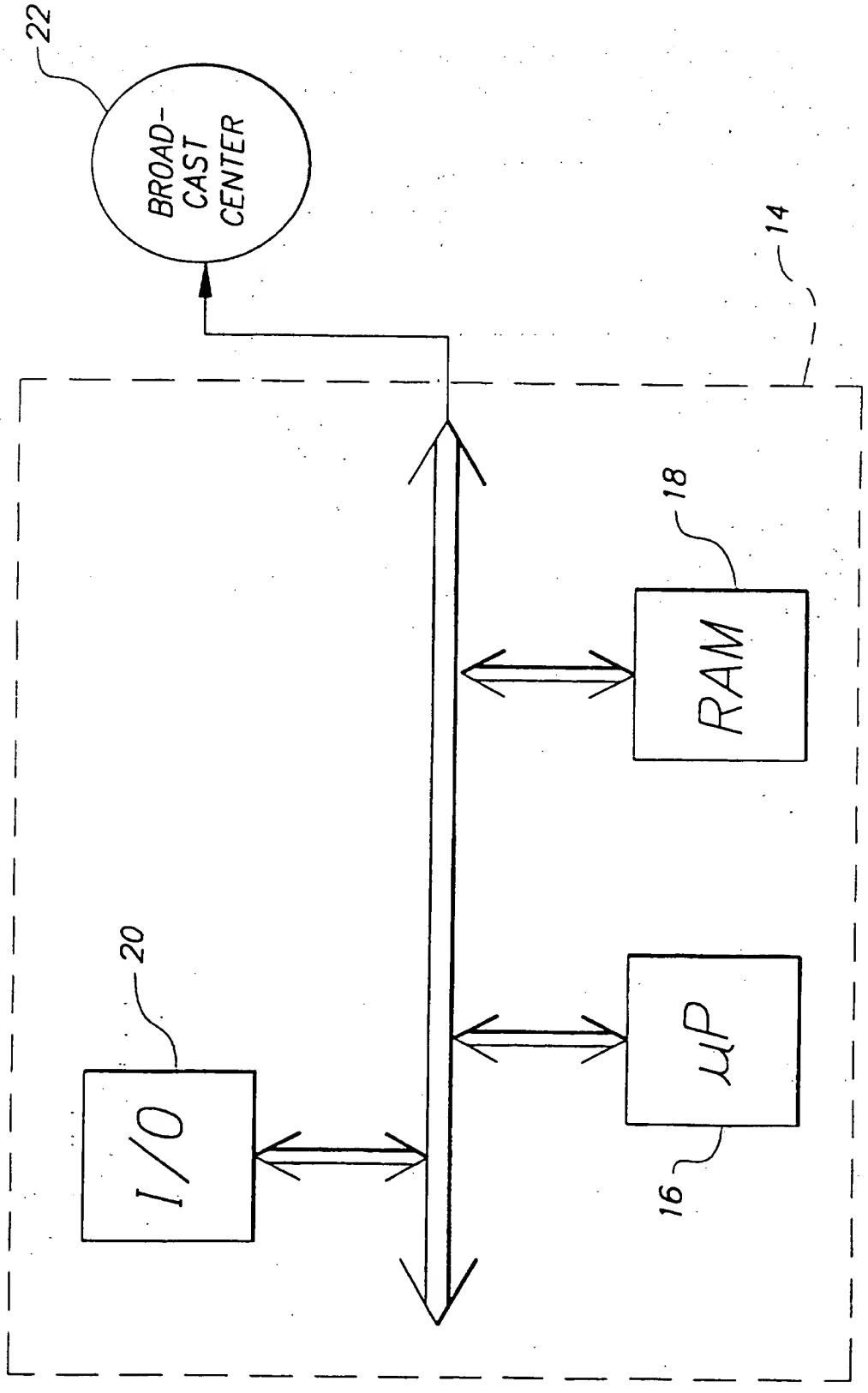


FIG. 2

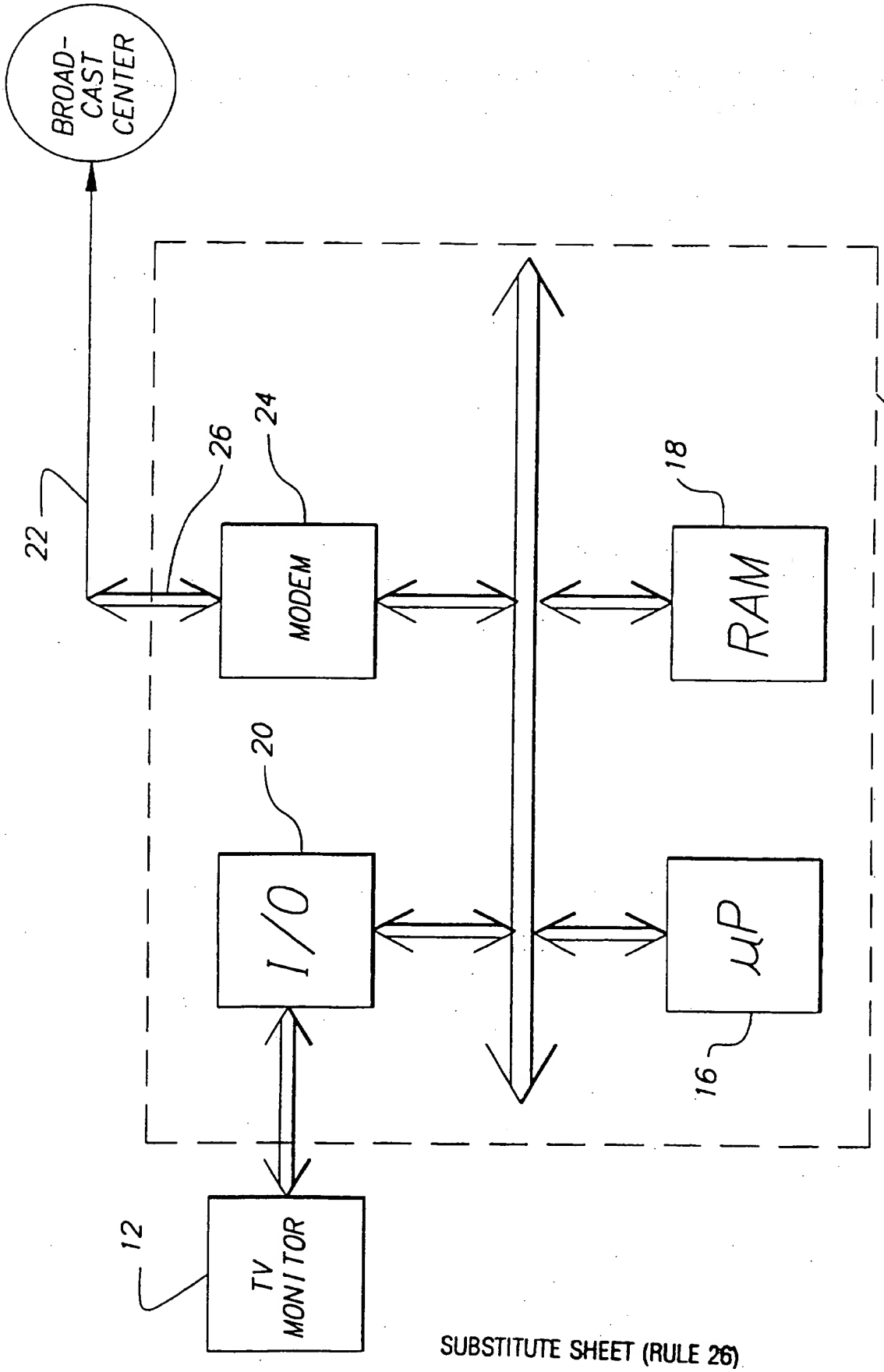


FIG. 3

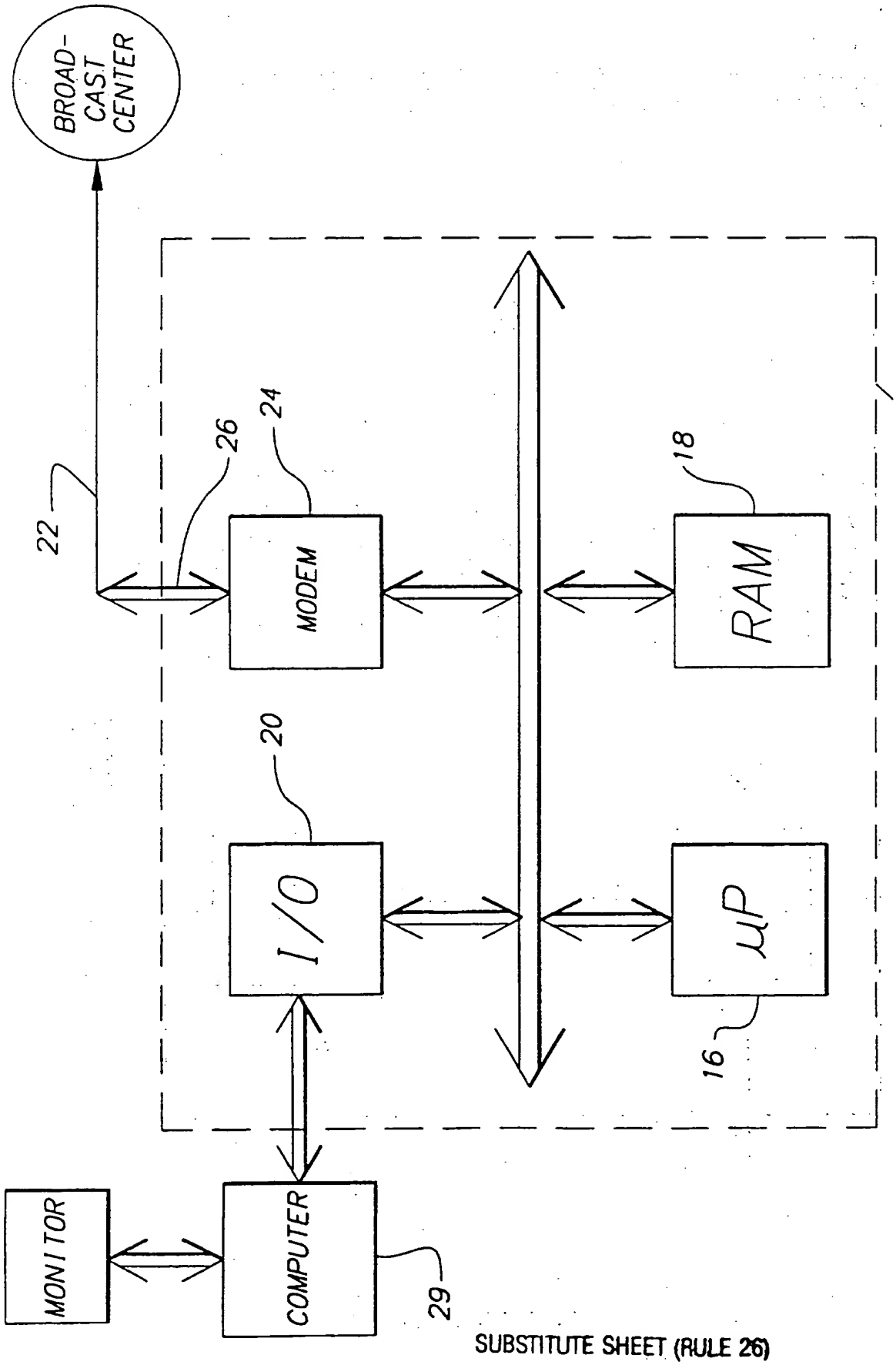

BROAD-
CAST
CENTER
22
26
24
MODEM
18
RAM
14
20
I/O
μP
16
MONITOR
COMPUTER
29

FIG. 3A

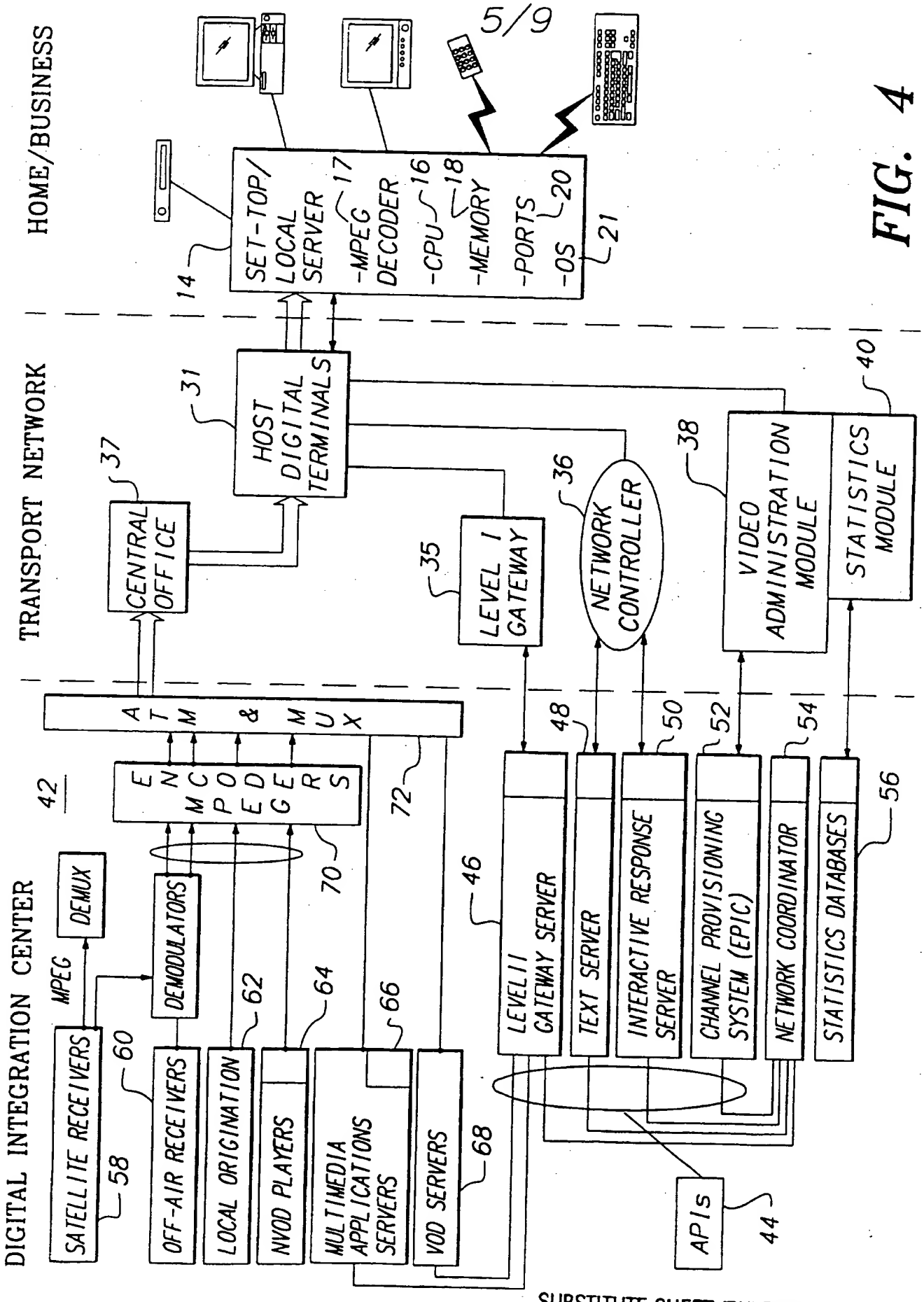


FIG. 4

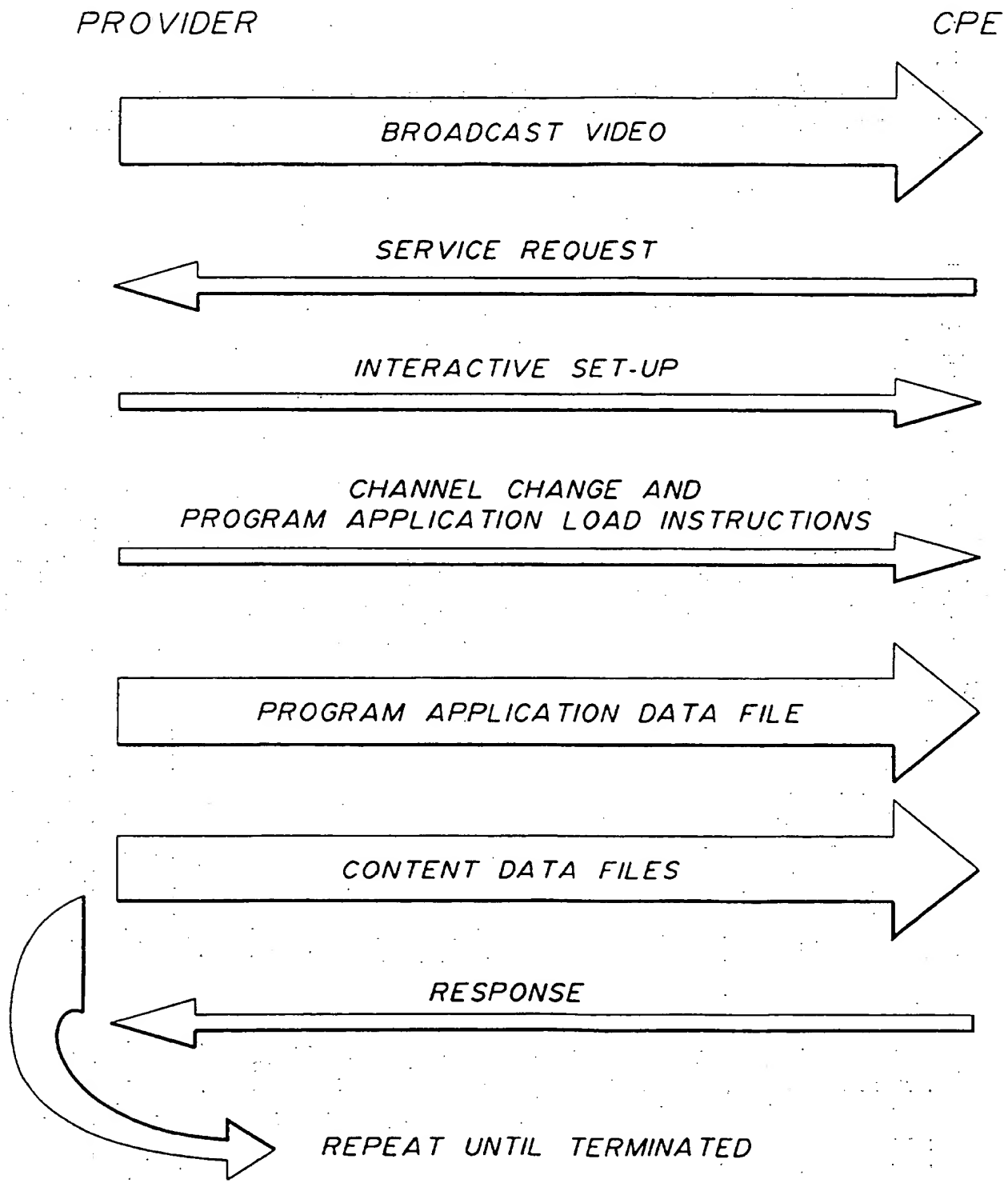

PROVIDER
CPE
BROADCAST VIDEO
SERVICE REQUEST
INTERACTIVE SET-UP
CHANNEL CHANGE AND
PROGRAM APPLICATION LOAD INSTRUCTIONS
PROGRAM APPLICATION DATA FILE
CONTENT DATA FILES
RESPONSE
REPEAT UNTIL TERMINATED

FIG. 5

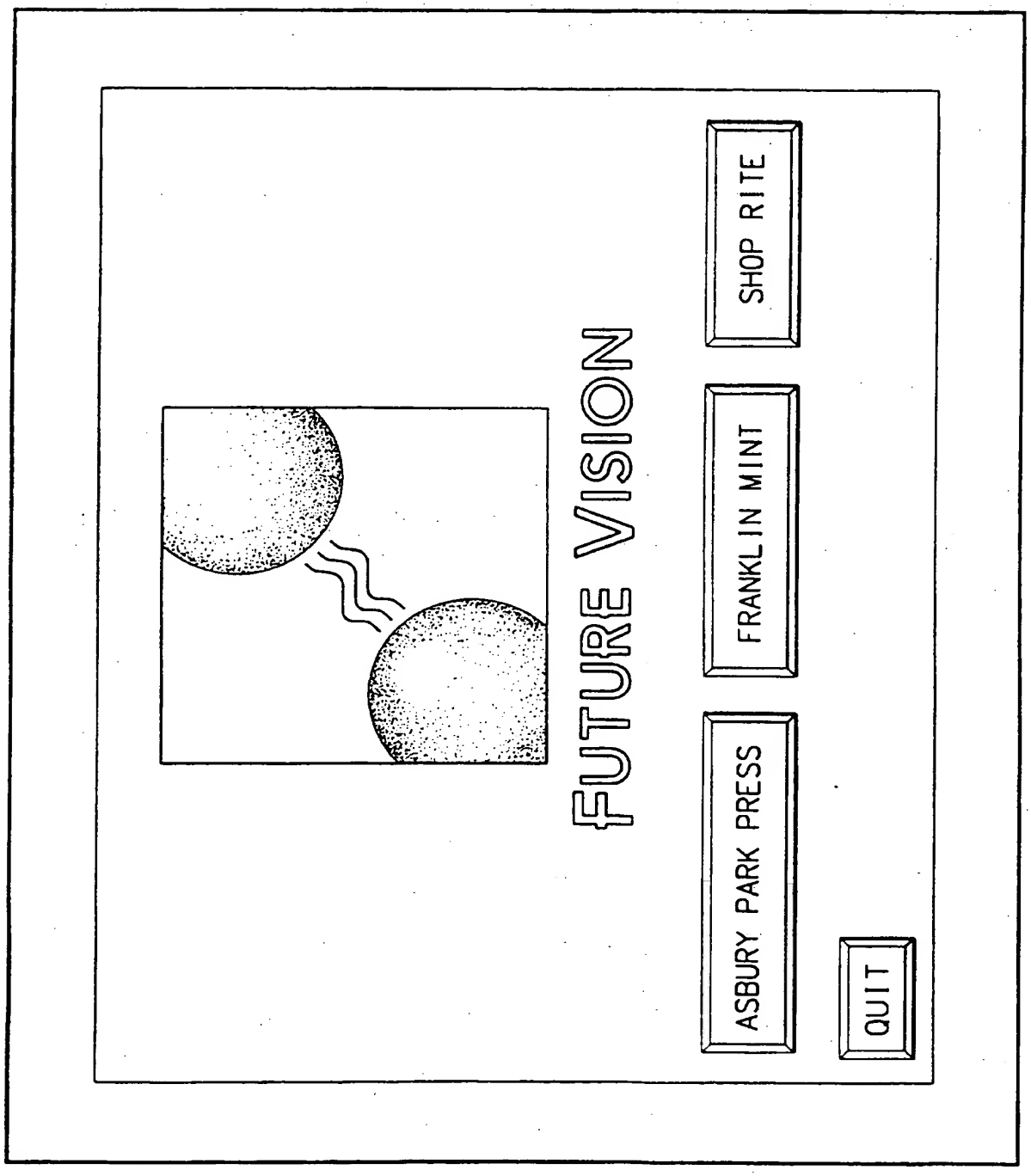


FIG. 6

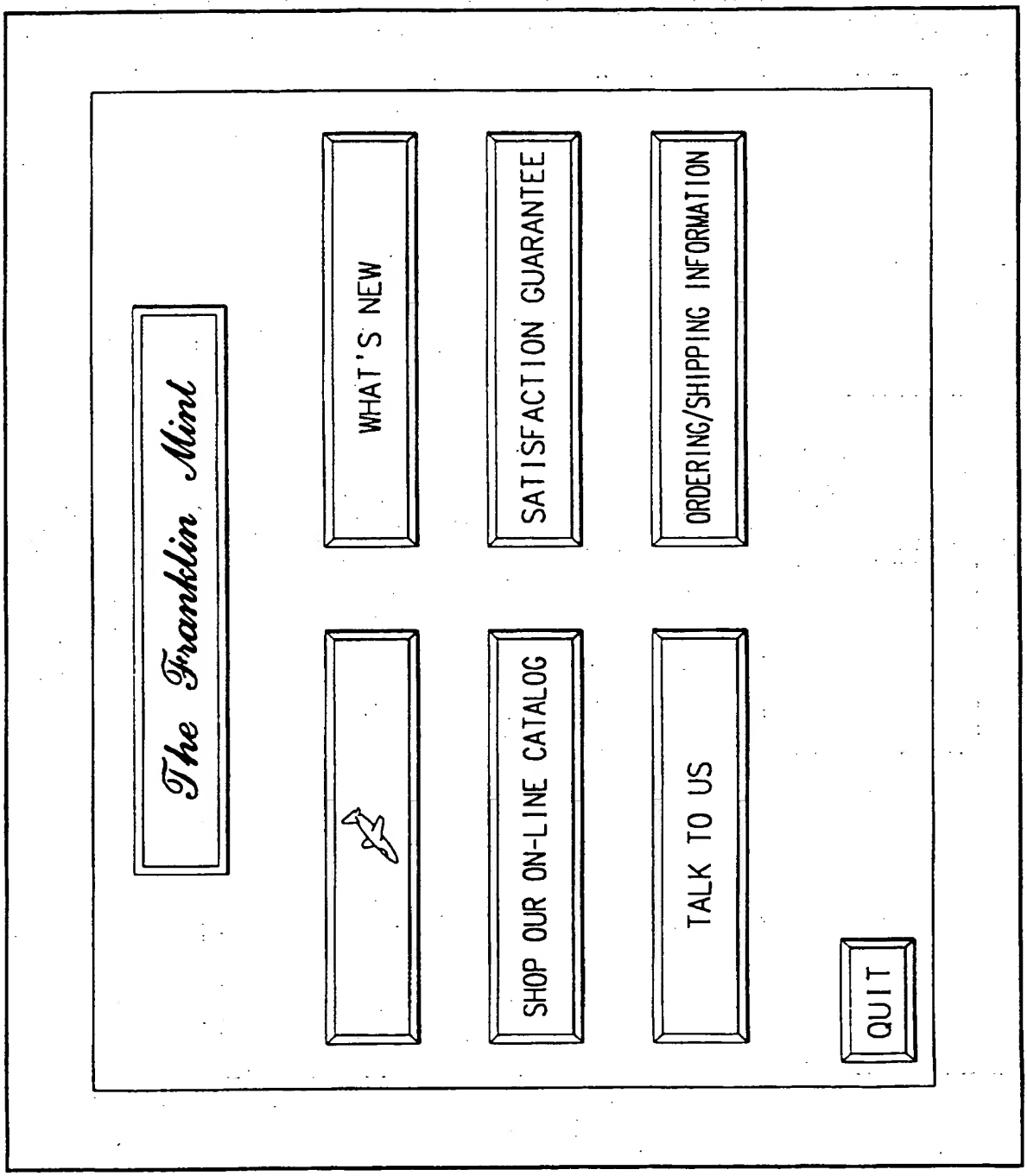

The Franklin Mint
WHAT'S NEW
SATISFACTION GUARANTEE
ORDERING/SHIPPING INFORMATION
SHOP OUR ON-LINE CATALOG
TALK TO US
QUIT

FIG. 7

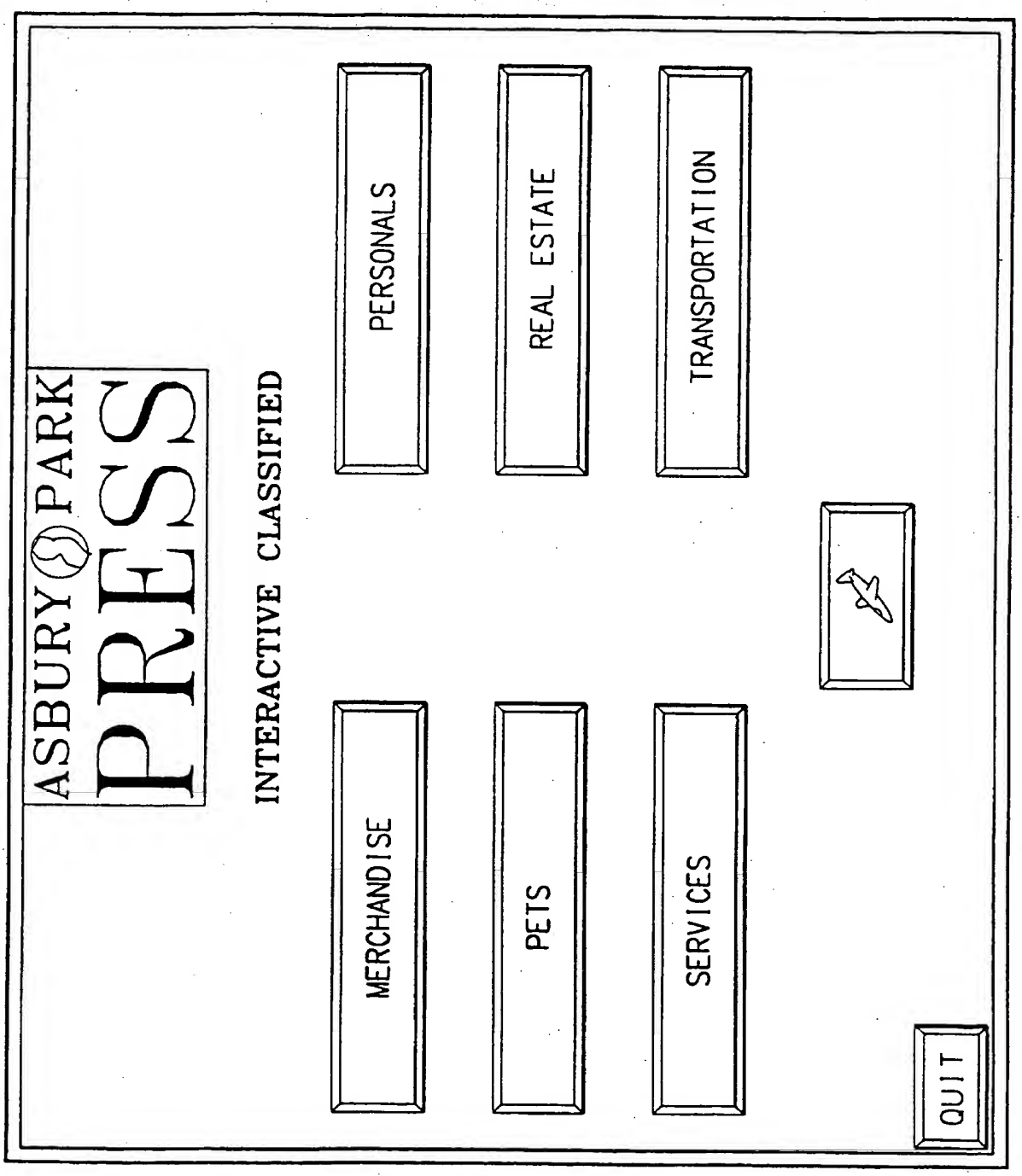


FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/07290

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :H04N 7/173
US CL :Please See Extra Sheet.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : Please See Extra Sheet.

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 5,014,125 (POCOCK ET AL) 7 May 1991, col. 18, lines 3-23.	1-12
Y,P	US, A, 5,357,276 (BANKER ET AL) 18 October 1994, see whole document and figures 1, 2a, 2b, 3, and 5a.	1-12

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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Date of the actual completion of the international search
20 JULY 1995

Date of mailing of the international search report
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JOHN W. MILLER

Telephone No. (703) 305-4700

Form PCT/ISA/210 (second sheet)(July 1992)★

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/07290

A. CLASSIFICATION OF SUBJECT MATTER:
US CL :

348/7, 13; 455/4.2, 5.1

B. FIELDS SEARCHED
Minimum documentation searched
Classification System: U.S.

348/6, 7, 8, 10, 11, 12, 13; 455/3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 6.1, 6.2, 6.3;
H04N 7/16, 7/169, 7/173

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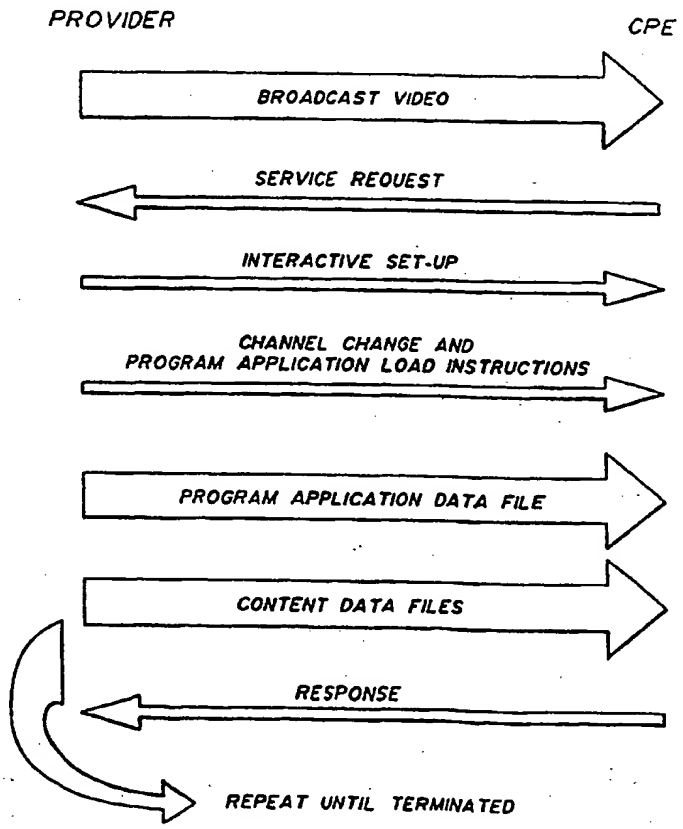
(54) Title: INTERACTIVE BROADBAND MULTIMEDIA SYSTEM

(57) Abstract

A method and apparatus for facilitating interactive television is disclosed. The method for facilitating interactive television comprises the following steps: accessing an interactive program; executing said interactive program; and providing an end user with a set of coded instructions which may be transmitted upstream.



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INTERACTIVE BROADBAND MULTIMEDIA SYSTEM

Field of the Invention

The present invention is directed to interactive television systems. In particular, the present invention is directed to interactive television systems which facilitate the transmission of control signals through interactive media, and which can be delivered to an end user station such as a television receiver or computer work station.

Background of the Invention

The present invention is directed to interactive television systems. In particular, the present invention is directed to interactive television systems which may be used to facilitate two-way communication between an end user and a provider center or service and which can be used to broadcast data files which may be accessed by a locally stored program to be displayed on a monitor as one or more presentations. The prior art has disclosed systems and devices which facilitate interactive television presentations.

Such prior art systems are characterized by the inclusion

of dedicated phone or transmission lines or expensive hardware. The use of such dedicated systems drastically increases the cost associated with the use of such systems.

The PRODIGY® information service, which is marketed widely by Sears® and IBM® claims to use a distributed database architecture. However, that system only distributes the database to regional main frame computers. The underlying technology still relies on the maintenance of continuous real time two-way communication by a personal computer. Nearly all videotex services use phone lines and modems to link the two, although some experiments with two-way cable television and other media have been attempted. Such systems have exhibited numerous limitations.

Because each user of a traditional videotex system is directly connected to a central main frame computer when "on-line", the central computer must be capable of simultaneously handling the many subscribers it gets during prime usage periods. The central computer may sit idle the rest of the time. If there is a problem with a central computer or communications net linking it to the end users, the entire system may cease functioning. Thus, prior art systems have typically relied upon a computer/print interfaces.

The speed with which information may be retrieved in such systems is limited to the speed with which the central computer can recognize a user's request and locate the information in a central data storage media. Even the largest and fastest of central computers cannot overcome the limitations of how quickly

information may be carried by the phone lines or other media that connect it to the user. Phone lines typically have a narrow bandwidth and can carry only a limited amount of information. Typical phone line communications are limited to a speed of 2400 baud.

The newer Integrated Services Digital Network (ISDN) and fiber optic cable technologies provide greater information transmission capability. However, even with high speed fiber optics which connect the central computer to a home terminal, the largest computers cannot keep up with an entire city, particularly during prime hours. These systems rely upon the single interaction of a computer and computer

The bandwidth issue has never been adequately addressed because until recently all computer interfaces were just character-based or used very low resolution alpha mosaic-style displays utilizing protocol such as NAPLPS or TELETEL. Because these systems do not use attractive graphical interfaces, they are not pleasing to the eye. Graphical user interfaces have become very popular because they are far more interesting and easier to use. Such systems utilize much more memory storage space.

There are a number of prior art patents directed to interactive communications systems. U.S. Patent Nos. 5,093,718 and 5,220,420 are directed to Interactive Home Information Systems. These patents disclose systems which incorporate a nodal structure which feeds in a broadband signal. The nodes are dedicated computers which reside outside of a house or group of

houses. The nodes couple to head end computer which is preferably an industrial microprocessor-based controller with high capacity magnetic or optic read/write storage devices.

U.S. Patent No. 5,233,436 discloses an interactive video system having a display for displaying camouflaged information which is discernible only when viewed through a partially transparent viewing screen having zones with light transmission characteristics corresponding to the characteristic of respective displayed image regions. The user of the system is required to input information which can be derived only by recognizing the camouflaged information with the aid of the screen.

Finally, U.S. Patent No. 4,745,559 discloses a data transmission system in which data templates are downloaded so as to facilitate data transmission and storage. This patent uses a system in which storage templates are locally retrieved and are associated with a unique identifier. The database records are stored locally and are updated from a remote location.

Each of the above systems requires dedicated hardware as shown for example in U.S. Patent Nos. 5,093,718 and 5,220,420 or the maintenance of a locally stored database. It would be desirable to provide a system in which interactive data could be broadcast to many customer premise equipment devices (CPE). Such devices could obtain control, graphical and audio data by recognizing and accepting specific data files within broadcast data streams and acting upon the data files such that the viewer would achieve the simulation of an interactive television system. The system would broadcast data files which would be selectively

retrieved by the individual viewer on a CPE. The files would be broadcast to all CPE'S in the system. The executing program could become resident and active at the CPE by being loaded from a data stream within a broadcast video channel; a data stream within a broadcast data channel; a pointcast data signal directed to a specific CPE or memory storage within the CPE. End user responses could be transmitted back to the provider using the network return data path. In this way, new files could be broadcast through the system such that the system could access the new information.

Summary of the Invention

The present invention is directed to a method for facilitating interactive television by an end user comprising the following steps: accessing a computer program for an interactive television display; executing said interactive program so as to provide at least one screen display; and providing a set of broadcast data files which may be accessed by said interactive program.

In a preferred embodiment, the present invention is directed to an apparatus for facilitating interactive television comprising: means for accessing an interactive television application program and presentation a plurality of broadcast data files; and means for controlling said program and broadcast files broadcast on a television monitor.

In yet a further embodiment, the present invention is directed to an apparatus for facilitating interactive television comprising: means for processing an interactive television

application program said program being pre-stored in said computer memory; means for accessing broadcast data files, each of said files corresponding to a presentation, and having an identification system associated therewith; and means associated with said end user station for transmitting a set of instructions to a remote location to control the broadcast of new data files.

Brief Description of the Figures

Figure 1 is a perspective view of an interactive control system in accordance with the present invention.

Figure 2 is a block diagram of an interactive television system in accordance with the present invention.

Figure 3 is a block diagram of an enhanced interactive television system in accordance with the present invention.

Figure 3A is a block diagram of an enhanced interactive system in accordance with the present invention which utilizes a computer and monitor as a presentation system.

Figure 4 is a block diagram of an enhanced television network system in accordance with the present invention.

Figure 5 is a flow chart of an interactive service in accordance with the present invention.

Figures 6 - 8 are screen displays in accordance with the present invention.

Detailed Description of the Preferred Embodiment

The present invention is described with reference to the enclosed Figures wherein the same numbers are utilized where applicable. In a broadest embodiment, the present invention is directed to a network having downstream broadcast capabilities,

upstream interactive communication capability and a microprocessor-based CPE (Customer Premise Equipment) capable of loading and executing a core program and accessing broadcast data files. The present invention accesses specific data files which are broadcast and which correspond to video, textual and/or audio presentation.

Referring to Figure 1, an interactive system of the present invention is described. As shown, in a most preferred embodiment of the present invention, the system 10 of the present invention is utilized in association with a television monitor 12 and end user control 13. End user control 13 may be accessed via a hand-held infrared controller 14. The system 10 of the invention, in a first embodiment, is housed in a control box or customer-premised equipment (CPE) 14. The box 14 is preferably a set-top control box connected to the television. The control box 14 is controlled by IR controller 15. In a most preferred embodiment shown in Figure 4, the CPE 14 comprises a CPU central processor 16, memory 18, I/O ports 20 and operating system 21. The CPE accesses data files which are broadcast.

The control box 14 or customer-premised equipment (CPE) includes circuitry for facilitating the receipt and storage of an interactive core program. As shown in Figures 2 and 3, the control mechanism in a preferred embodiment is a microprocessor-based control system. The system incorporates microprocessor 16, RAM 18 which processes a core program and chooses broadcast data files and an input/output device 20 which transmits commands to the set-top control box. As shown in Figure 3, the device may

include a modem 24 connected to the broadcast center 22 via a telephone line 26. The modem can connect to a broadcast center such that a new program or set of data files can be broadcast. As shown in Figure 3A, the end user system may comprise a computer and monitor 29 rather than a television receiver. The present invention contemplates accessing a core program which facilitates the receipt and control of data files. Each data file represents a presentation.

The present invention contemplates several mechanisms for delivering the core program data to the CPE 14. Initially, the core program may reside on the CPE 14. In addition, the program may be transmitted from a data stream within a broadcast data signal associated with a broadcast video channel. Alternatively, the CPE device 14 may be switched to a broadcast data channel and the program pointcast from a data stream within the broadcast channel.

The core program identifies, loads and executes specific data files which are broadcast. The data files are displayed as textual information still visual audio information based upon specific control elements within the data file. The data files are broadcast. The program may need to switch among different broadcast channels in order to locate the desired data files.

In a preferred embodiment, the data files are obtained by the core program from a broadcast data signal associated with a broadcast video channel and a broadcast data signal associated with a broadcast data channel. The core program is instructed which data file identification number (ID) to identify and

execute by the previous executed data file or a control command from the provider delivered by the network's interactive communications system. Hence, the core program facilitates the receipt of files from the broadcast.

When the beginning of the desired data file is identified in the broadcast data stream, for example, by a header ID, that file is acted upon by the program application. Each file will typically contain a still frame image and software for controlling the selection of new files broadcast. Thus, for example, a presentation is provided which queries the user to make an additional selection. The user may select the core program will then search for the selection from the broadcast data files. The file selected will be identified by its file ID and then the video element displayed on the monitor. The program control elements of the data file provide the program application with the instructions necessary to act upon the other elements of the data file. The instructions may indicate that the video element is to be displayed in full or partial screen with a repeating audio element for a specified amount of time.

The number, placement, size of user interface buttons would also be indicated along with the action to be taken upon button selection. Actions may include executing an audio element, displaying a text element, loading and executing additional data files. The actions are activated with the controller. The files may be compressed such using MPEG or other compression technology. In the case of an MPEG compression system, six megabits of data may be transmitted per second. A data file will

variable in byte size. Thus over 60 files may be transmitted per second. The core program will identify files by the respective file ID as different files are requested, additional files will be identified by the program. Thus if the file ID is called for, the program will the presentation.

During the program application execution, end user responses are communicated upstream via the instructive call communication return path. This return path may comprise the CATV cable. Alternatively, the path may also comprise a modem dialer affixed to the phone system at the local premises which transmits messages to the central station.

The upstream return instruction is coded to identify all data files being accessed and the end user response thereto. The return information may be used to collect usage, statistics, notification and user requests or purchases. Additionally, the information transmitted by the CPE may dynamically adjust the frequency OF which a specific data file is broadcast by the broadcast data file server. Hence, if subscribers don't request certain information on a frequent enough basis, those files can be deleted from the system.

It is to be noted that the frequency with which a specific data file is delivered in the broadcast stream may be varied based upon an algorithm which determines the likelihood of need by any CPE. The core program may be instructed to identify and load a specific data file prior to it being needed based upon an algorithm which determines the likelihood it will be needed by the core program.

Figure 4 comprises a more detailed embodiment of the present invention as applied to a communication network. As shown, the system in a most preferred embodiment comprises three principal regions: the home/business; the transport network and the digital integration center. The home or business includes the set top/local server (CPE) 14, an MPEG (decoder) 17, CPU 16, memory 18, ports 20 and operating system 21. While the invention is shown in the context of an MPEG compression system, it is to be appreciated that other compression technologies may be used with the present invention.

The local CPE 14 communicates with a transport network including host digital terminal 31, a central office 33 and a Level I gateway 35. The host digital terminals are in communication with the gateway 35, CPE 14 and central office 37. The Level 1 Gateway 35 includes a network controller 36, video administration module 38 and statistics module 40.

The third major element is the digital integration center 42. This element includes the API (Applications Program Interface) 44 which includes the level II gateway server 46, text server 48, interactive response server 50, channel provisioning system (EPIC) 52, network coordinator 54 and statistics databases 56. The center 42 may include satellite receivers 58, off-air receivers 60, local origination 62, NVOD players 64, a multimedia applications server 66 and VOD (Video On Demand) server 68. The center also includes an MPEG encoder 70 and ATM encoder and MUX 72. The digital integration center functions as the central broadcast center which broadcasts the data files through the

central office and to the individual homes or businesses in the system. The end user may access an interactive presentation via the hand-held controller 15. The core program will be activated. The broadcast signal coming through the home/business will include files which will be accessible through the CPE 14.

Figure 5 is a flow diagram which displays the operation of the present invention. As shown, a provider transmits a broadcast video signal. A subscriber who desires to engage an interactive session transmits a service request via the hand-held IR controller or by activating buttons on the CPE. The provider then establishes an interactive response session and for example, instructs the CPE to perform a channel change and program application load instructions. The program application data file and the content data files are transmitted to the CPE via a broadcast signal. The subscriber can then query the provider for additional presentations which will be broadcast from the center.

Referring to Figures 6 through 8, examples of interactive presentations are shown and disclosed. Initially, the subscriber will input the interactive command in the controller. This can be accomplished by sending a signal or command to down-load the interactive presentation. The command can be input either with the hand-held tuner or by the activation of a button on the control box or CPE. In the following example there are three interactive presentations which are presented on the television monitor. A first is for the Asbury Park Press. A second is for the Franklin Mint. The third is for SHOP RITE Supermarkets.

Each of the presentations has an associated file number

which is used to identify the presentation in the broadcast stream.

Referring to Figure 6, the screen for the Franklin Mint is disclosed. The screen shows an advertisement for the Franklin Mint with a plurality of access items including an on-line catalog, a satisfaction guarantee, ordering and shipping information as well as a screen for new information.

The user will activate the particular presentation desired which will draw in a broadcast data. The presentation selected may be displayed. Additional screens may be accessed from the broadcast and shown on the screen. Further information may be accessed by transmitting a signal upstream. Additional information may then be broadcast to the CPE 14. It is to be noted that information does not have to be received upstream before the next file is accessed.

Figure 8 provides an example for incorporating a newspaper such as the Asbury Park Press into the system. In this example, the Asbury Press would provide a series of interactive presentations to subscribers of the system. These interactive presentations could include, for example, merchandise, pets, services, personals, real estate and transportation. A subscriber who, for example, desires to view a real estate presentation will activate the real estate command via the hand-held controller.

A real estate presentation will then be shown to a subscriber on the TV monitor. If additional information is requested, a command can then be transmitted on the return path,

by the IR controller for example. The command alternatively could be transmitted via a modem, and additional presentations may then be broadcast and presented on the screen.

In yet a further example, a consumer may watch a program such as "CNN Money Line" in which a well known mutual fund manager may be describing the investment strategy of the fund. A text overlay will be displayed querying the consumer if he would like to have additional information via an interactive application.

By responding affirmatively using the remote control 15, the present invention will automatically switch the user to the application and later switch the consumer back to the original program when he is finished with the application. During the application, additional information can be given to the consumer is broadcast to the consumer in the form of files. If the consumer transmits a signal upstream, information on the consumer can be collected and transactions can be completed.

The examples of effective uses include services, products, information, insurance, travel. The ability to target interactive promotions, advertisements, and marketing efforts is enormous. The invention can identify consumers by demographics, geography, or programming viewing preferences.

The present invention has been described with reference to the above-detailed description. It is to be appreciated that other embodiments fulfill the spirit and scope of the present invention and that the true nature and scope of the present invention is to be determined with reference to the claims

appended hereto.

Claims

1. A method for facilitating interactive television by an end user comprising the following steps:

accessing a computer program for an interactive television display;

executing said interactive program so as to provide at least one screen display; and

providing a set of broadcast data files which may be accessed by said interactive program.

2. The method of claim 1 wherein said set of data files is transmitted on the vertical blanking interval of the video signal transmitted to said television.

3. The method of claim 1 wherein said interactive program is pre-stored in a computer memory associated with the end user.

4. The method of claim 1 wherein the interactive program is transmitted on a second broadcast channel.

5. Apparatus for facilitating interactive television comprising:

means for accessing an interactive television application program and presentation a plurality of broadcast data files; and

means for controlling said program and broadcast files broadcast on a television monitor.

6. Apparatus for facilitating an interactive television session of claim 5 wherein said interactive presentation resides on a computer memory.

7. Apparatus for facilitating interactive television of claim 6 wherein said presentation is transmitted on a broadcast signal.

8. Apparatus of claim 7 wherein said data signal is transmitted through the vertical blanking interval.

9. Apparatus of claim 7 wherein said signal is broadcast to a second broadcast channel.

10. Apparatus for facilitating interactive television comprising:

means for processing an interactive television application program said program being pre-stored in said computer memory;

means for accessing broadcast data files, each of said files corresponding to a presentation, and having an identification system associated therewith; and

means associated with said end user station for transmitting a set of instructions to a remote location to control the broadcast of new data files.

11. The apparatus of claim 10 wherein said end user station

is a television receiver.

12. The apparatus of claim 10 wherein said end user station is a computer and monitor.

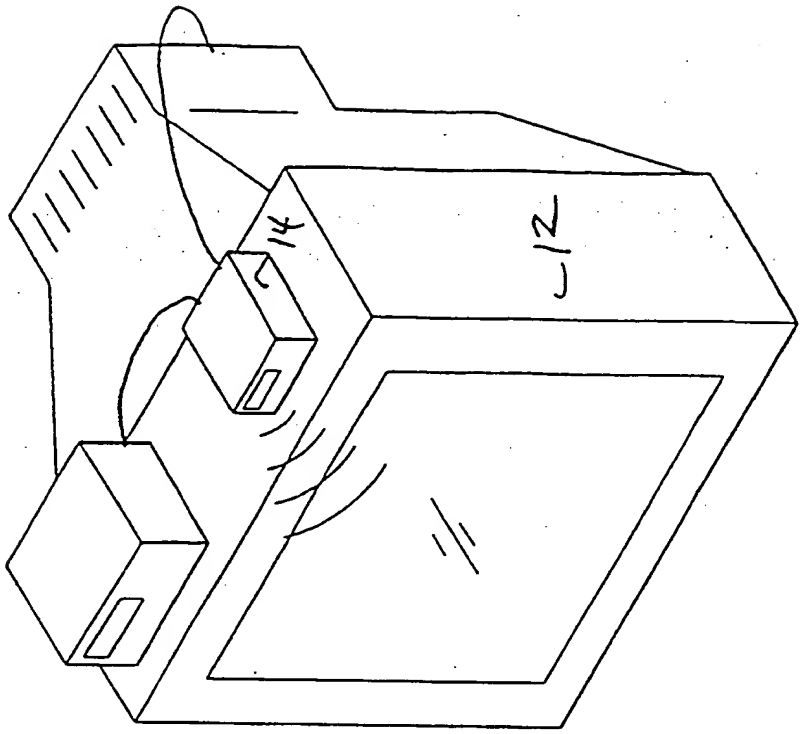
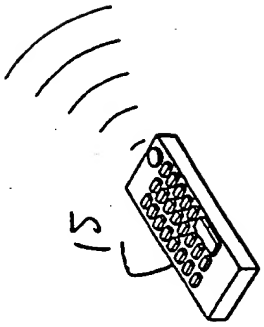


FIG. 1



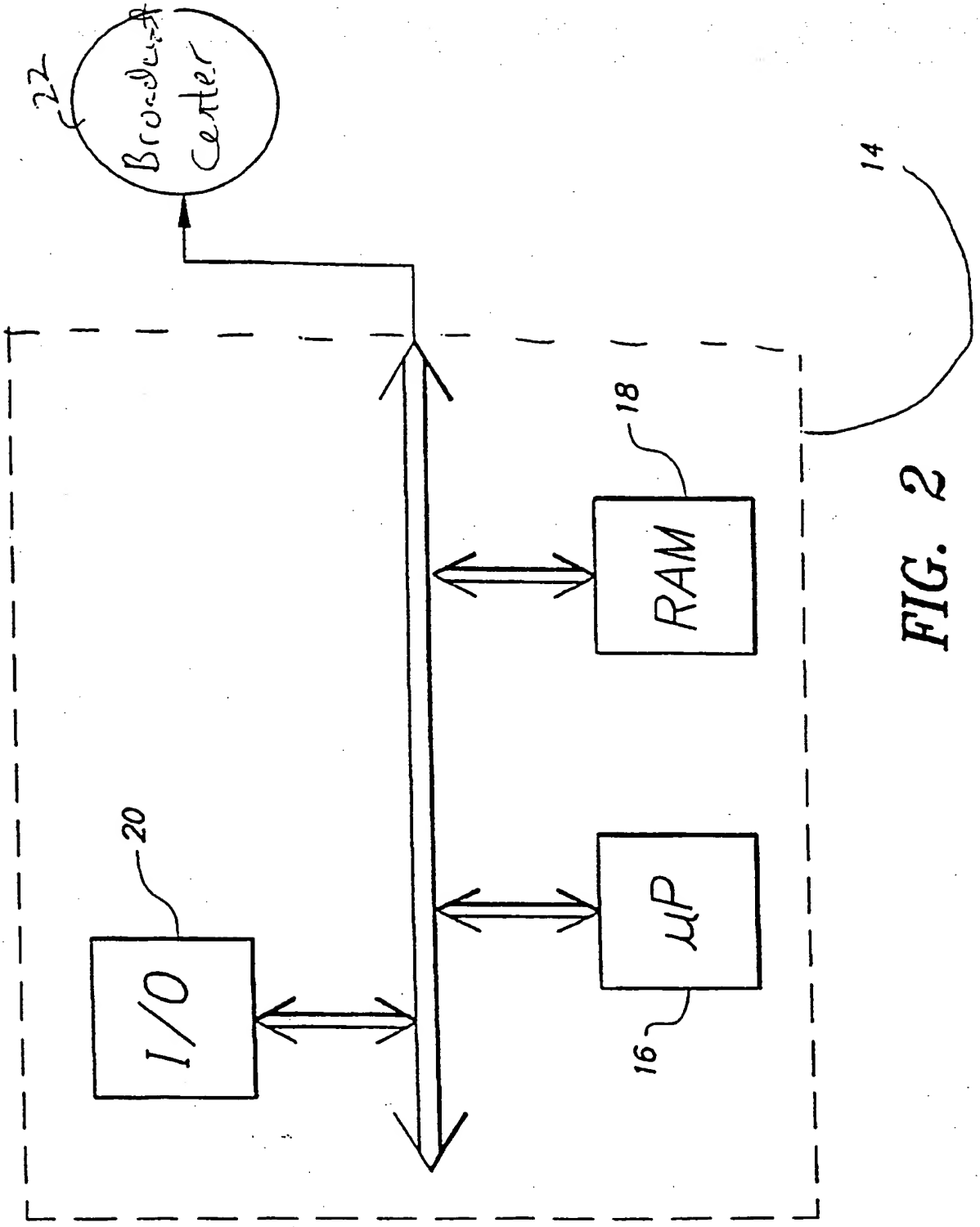


FIG. 2

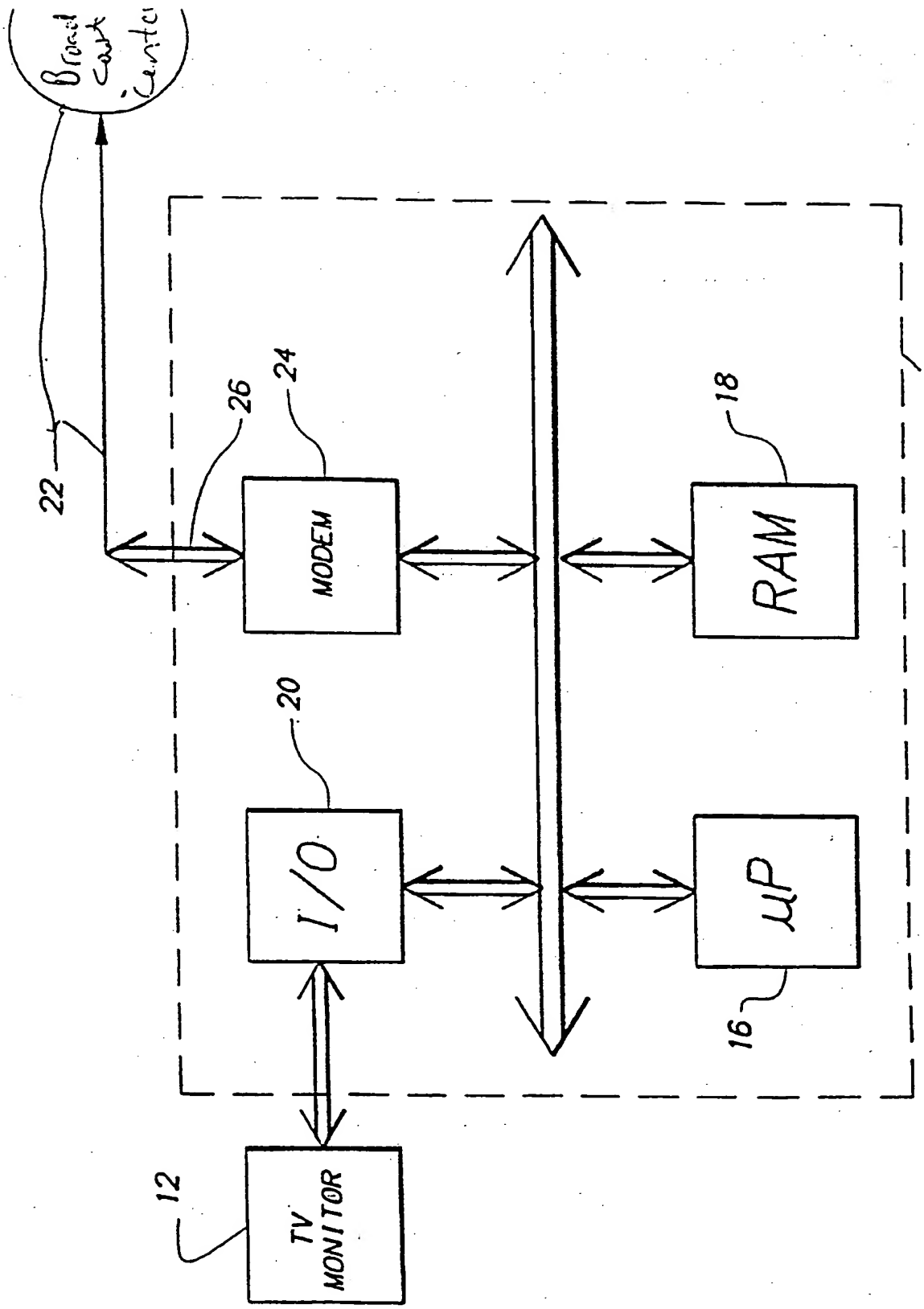

Broadcast center
22
26
24
MODEM
18
RAM
14
20
I/O
μP
16
12
TV MONITOR

FIG. 3

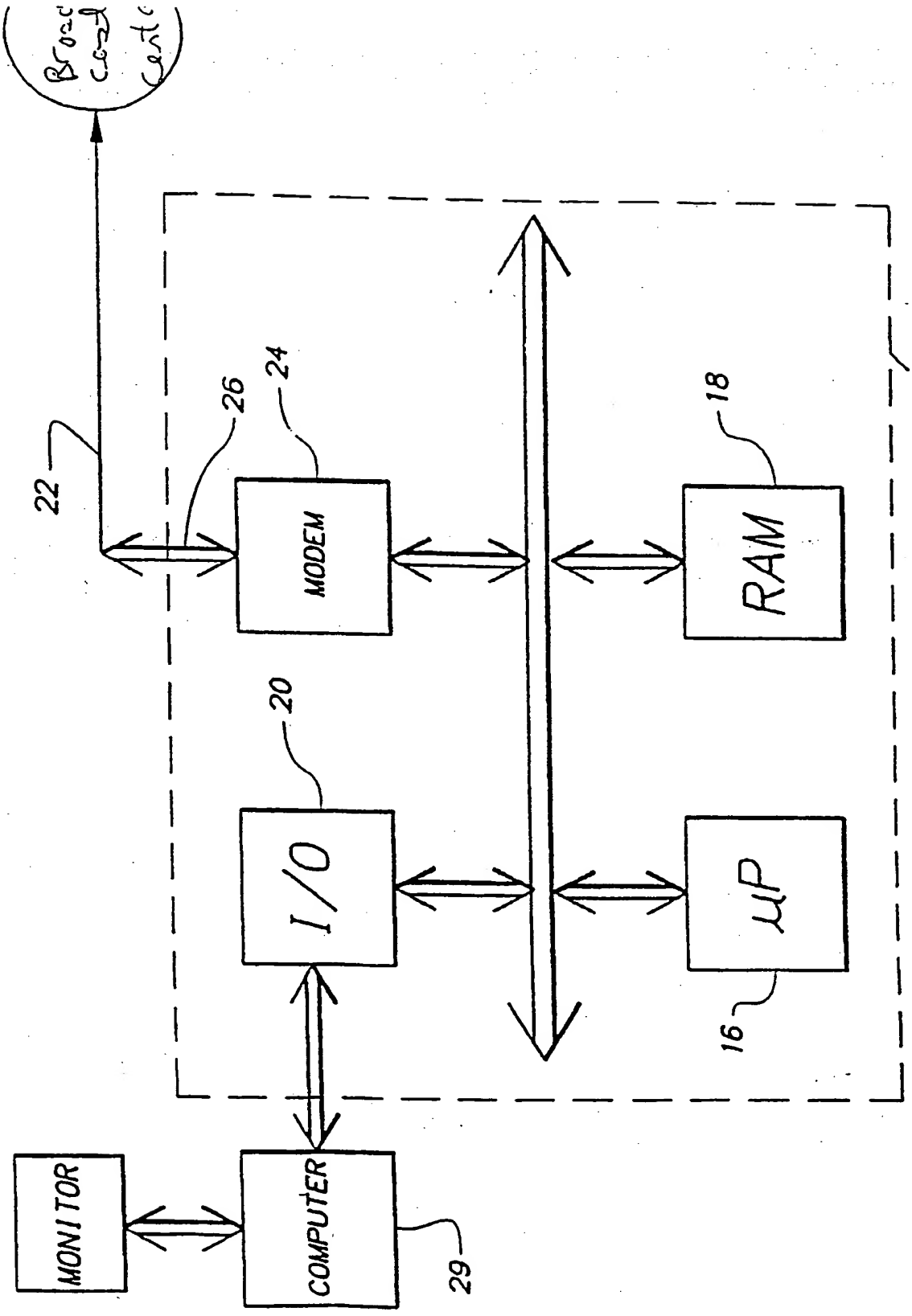
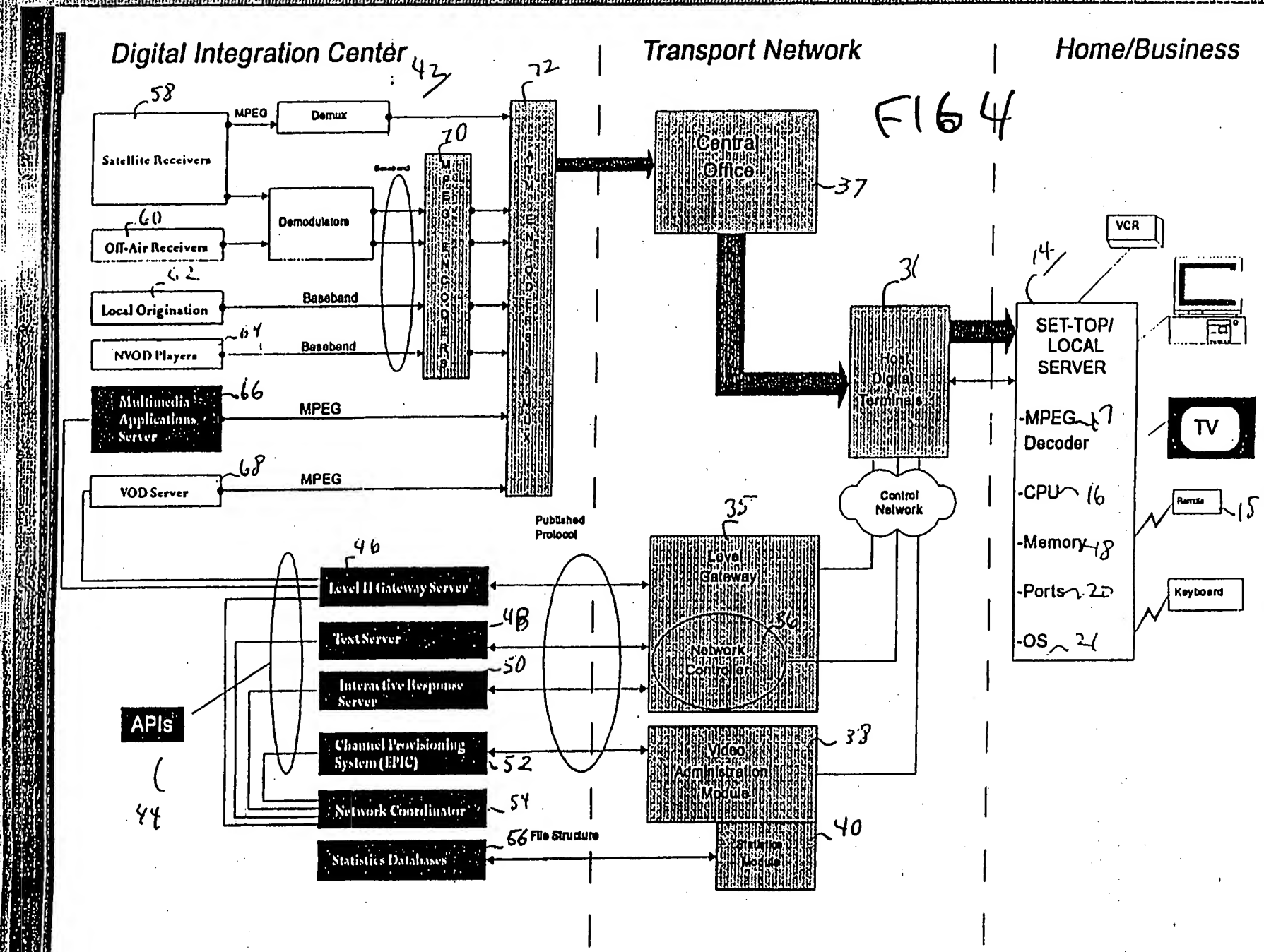


FIG. 3A


Digital Integration Center
Transport Network
Home/Business
F164
42
58
Satellite Receivers
MPEG
Demux
72
70
Demodulators
Baseband
60
Off-Air Receivers
62
Local Origination
Baseband
64
NVOD Players
Baseband
66
Multimedia Applications Server
MPEG
68
VOD Server
MPEG
ATM ENCODER & MUX
MPEG ENCODER
Central Office
37
31
Digital Terminals
14
SET-TOP/ LOCAL SERVER
-MPEG Decoder
-CPU 16
-Memory 18
-Ports 20
-OS 24
VCR
TV
Remote
15
Keyboard
Control Network
Published Protocol
35
Level Gateway
Network Controller
36
33
Video Administration Module
40
Interface Module
46
Level II Gateway Server
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Text Server
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Interactive Response Server
52
Channel Provisioning System (EPIC)
54
Network Coordinator
56 File Structure
Statistics Databases
APIs
44

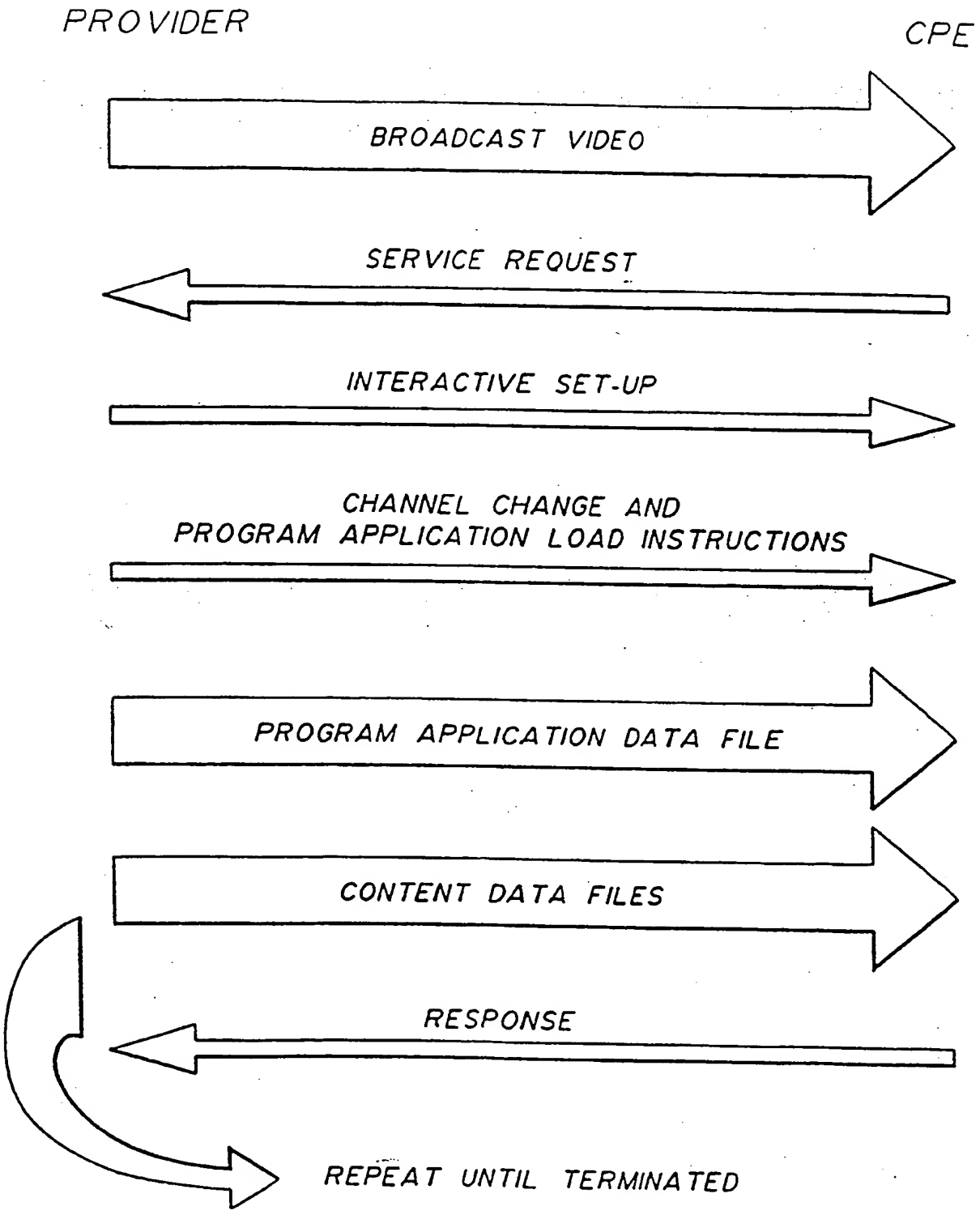

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FIG.

FIG 9

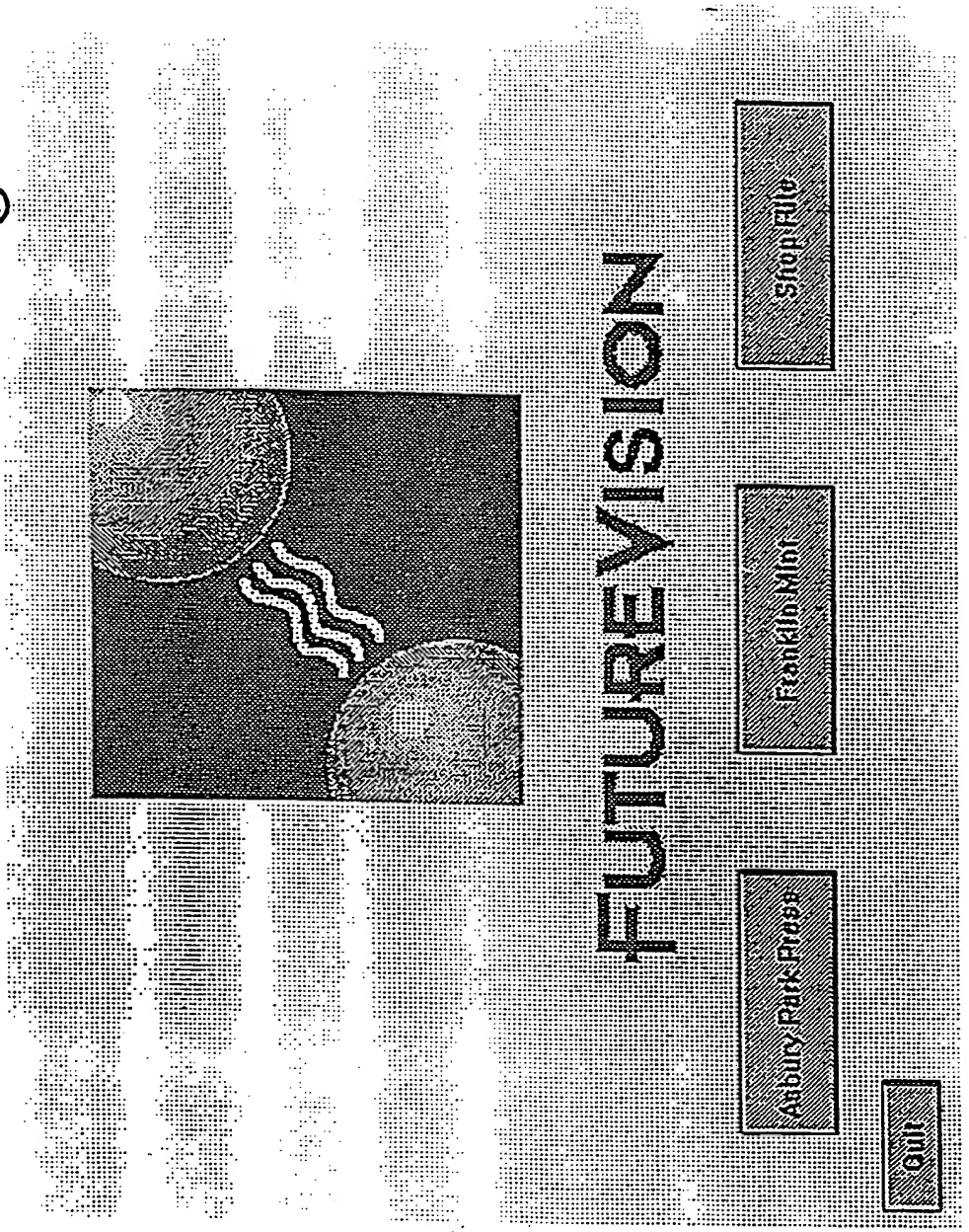
FUTUREVISION
Stop Film
Franklin Mint
Ashley Park Press
Quit

FIG 7

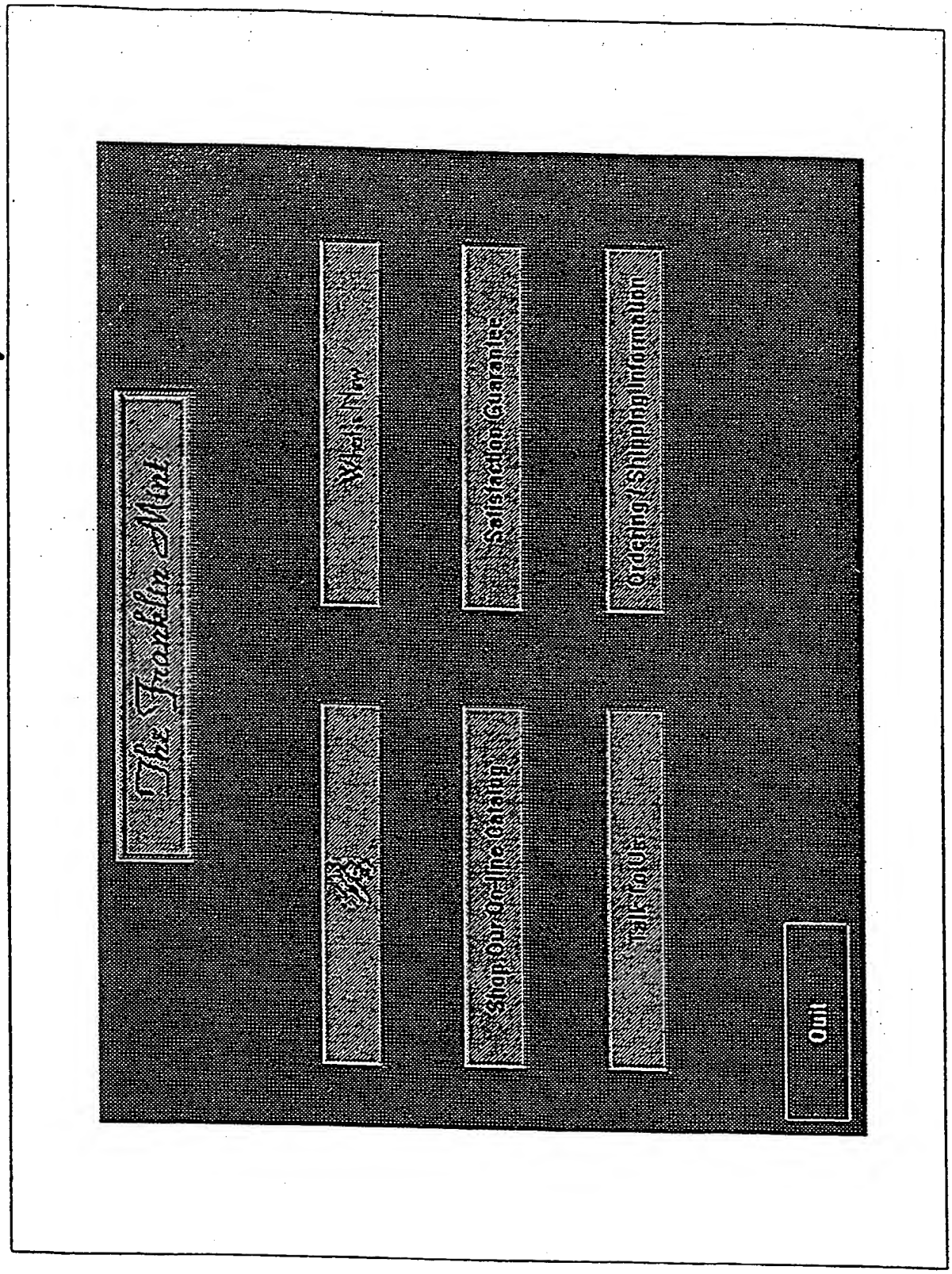

FIG 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/07290

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :H04N 7/173
US CL :Please See Extra Sheet.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : Please See Extra Sheet.

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 5,014,125 (POCOCK ET AL) 7 May 1991, col. 18, lines 3-23.	1-12
Y,P	US, A, 5,357,276 (BANKER ET AL) 18 October 1994, see whole document and figures 1, 2a, 2b, 3, and 5a.	1-12

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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"O"	document referring to an oral disclosure, use, exhibition or other means		
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Date of the actual completion of the international search	Date of mailing of the international search report
20 JULY 1995	22SEP1995
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer JOHN W. MILLER Telephone No. (703) 305-4700

Form PCT/ISA/210 (second sheet)(July 1992)*

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/07290

A. CLASSIFICATION OF SUBJECT MATTER:
US CL :

348/7, 13; 455/4.2, 5.1

B. FIELDS SEARCHED
Minimum documentation searched
Classification System: U.S.

348/6, 7, 8, 10, 11, 12, 13; 455/3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 6.1, 6.2, 6.3;
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